

THE TECHNIQUE OF PROSTATECTOMY.¹

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OF the two diseases of the urogenitalia, classified as being essentially obstructive, namely, urethral stricture and hypertrophic enlargement of the prostate gland, the latter is by far the most serious. In both, the pathologic results fall, primarily, upon the bladder, interfering, at first, with the comfort and, later, with the health and life of the individual. If one might eliminate the element of obstruction, both diseases would sink into insignificance; for neither the cicatricial tissue in the former, nor the fibro-adenomatous mass in the latter, can possibly affect the health of the subject. Clearly, then, a study of the pathogenesis and pathology of the bladder lesions offers the best guide to therapeutic adaptation. In order, however, to study the bladder lesions, one must eliminate the element of cystitis, which is not a necessary consequence of obstruction, and also the resulting seminal disturbances, since they, in the face of the larger and more serious consequences to the bladder, sink into a subordinate place.

In stricture we have an example of urinary obstruction, pure and simple, the effects of which upon the bladder, falling entirely upon the muscular coat, determine hypertrophy in its highest degree and purest form. Until the advent of inflammation there are no changes in the mucous lining, or in the

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circulation, other than come of the thickening of the middle coat with lessening in capacity, *i.e.*, in distensibility.

In prostatomegaly there is also a urinary obstruction, to which, however, must be added a circulatory obstruction, occurring in the earlier stages, altering the picture and giving greater gravity to the bladder lesions; for, while the overgrowth is encroaching upon the urethral lumen, the swelling mass presses upward and outward about the bladder neck, squeezing the valveless veins of the vesicoprostatic plexus against the fibrous envelope, obstructing the venous drainage of the bladder and determining a venous hyperæmia in its walls which can hardly fail to produce trophic results; so that, in prostatomegaly, we have both a urinary and a circulatory obstruction.

Sufficient importance has not, it appears, been attached to this venous obstruction and its effects upon the nutrition of the bladder-wall in accounting for the symptomatology and pathology of the bladder changes in prostatics. In the writer's opinion, it constitutes one of the chief factors in the evolution of the condition known by the collective term prostatism.

In simple urinary obstruction we observe, long before the advent of inflammatory changes, simple, uniform hypertrophy of the middle coat with, in the earlier stages, a corresponding reduction of distensibility. For the most part, trabeculation and the tendency to sacculation are absent. When we have occasion to do epicystotomy in these cases, even in old men without enlarged prostates, we observe, on exposing the anterior vesical wall, no unusual varicosities. Symptomatically, nocturnal frequency is entirely absent, and, for the most part, diurnal frequency is not noticeable, while exercise is apt to increase the latter. Vesical atony and residual urine are rare and occur only in the later stages.

In prostatomegaly, trabeculation, sacculation, atony, distention, and residual urine are, among the observed conditions, so common as to constitute the chief foundation for diagnosis; while enormous dilatation of the vesical plexus and its afferent veins is so prominent as to elicit mention by the anatomists.

(Quain's "Anatomy," Vol. iii, No. 4, p. 248.) Symptomatically, nocturnal frequency is almost, if not quite, pathognomonic, while exercise and all other aids tending to improve the general and local circulation are well known to lessen frequency and reduce vesical distress.

Furthermore, removal of the obstacle to urination in stricture is promptly followed by disappearance of the hypertrophy of the middle coat, which is its only pathological consequence; while removal of the urinary obstruction in prostatics by catheterization is followed by only a partial involution of the more profound and complex bladder changes which have been wrought. Epicystotomy in a considerable number of prostatics who have been in catheter life for a long time has impressed the writer with the conviction that the removal of the urinary obstruction in these cases has but slight, if any, effect upon the circulatory disturbances. Large, tortuous, and engorged veins have been as frequently seen in these cases as in those where the catheter had not been resorted to; while in one case requiring epicystotomy, five months after a perineal prostatectomy, this condition of the vessels was notably absent.

In the coarse anatomicopathological observations, made during fourteen years of operative work, the impression has been gained that, so far as concerns the muscular coat of the bladder in prostatics, it is the pathological field where atrophy and hypertrophy, degenerative and regenerative changes are contending. The marked development of the inner fasciculi suggests hypertrophy, while the thinned subfascial bands, without trabeculation, offering little or no resistance to herniation of the mucous coat, give the impression of atrophy. Often—indeed, nearly always—the picture is obscured by the appearances ordinarily found in inflammation; but when one observes, on exposing the anterior wall of a distended bladder, several cystlike vesicles, easily passing between large and strong inner muscular bands, spreading out like coins under the thin vesical fascia, changing their size with respiration, and finally disappearing when the bladder is opened, the im-

pression is irresistible, and one may have a wish to see the matter investigated without going so far as to say that these appearances, which have been observed only in prostatics, seem to bear a certain relation to the evidences of venous obstruction. Whether or not such investigation would bear fruit, it is quite certain that the pathological conditions of the bladder in prostatics when compared with those in simple, non-obstructive cystitis and with stricture cases, offer distinct evidences of difference for which explanation is sought, and which may not be found so long as we regard them as being essentially inflammatory, giving too little heed to those etiological influences which, as the combined results of urinary and circulatory obstruction, precede the cystitis by a long period. To this point S. Alexander has already called attention with insistence. Nevertheless, since cystitis is a frequent link in the pathologic chain of prostatism, the surgeon seeking technical guide, neither wonders nor regrets that the pathologist takes it as the starting-point of his investigation; all the less so since he is compelled to work backward towards its etiology.

If objection be made that the retrogressive nutritional changes in the muscular coat are due to the substitution of the catheter for normal micturition, thus nullifying the function of the detrusor, one at once calls to mind the fact that these changes are seen also in the bladders of prostatics who have never been in catheter life. Moreover, the mere expulsion of urine is not the only incentive to muscular contraction of the bladder. Cystoscopy has familiarized us with the fact that the bladder is, normally, in as active a state of peristalsis as a coil of intestine which is drawn out of an abdominal incision. Besides maintaining a slight tonic contraction upon the contained urine, peristaltic waves are constantly coming down the ureters and spreading over the vesical wall. These waves originate also in other parts of the bladder, to spread in different directions, constantly changing the degree of tension. Physical efforts and mental emotions (Griffiths in the *Journal of Anatomy and Physiology*, 1894-95, p. 254), changes in the character and reaction of the urine (Ashdown, *ibid.*, Vol. xx, p. 299),

are additional excitants to this peristalsis, so that we must regard the muscular structure of the bladder as in a constant state of activity.

Clinically, we have opportunity to observe this notably in cases of distention where we find intermittent, colicky cramps, even in greatly distended bladders. It is probably to this muscular activity, many times increased, that we must attribute the hypertrophy observed in cystitis without urinary or circulatory obstruction.

It is plain then, that, whether or not we eliminate inflammation, the pathological lesions of the bladder in prostatics are, when contrasted with those resulting from urethral stricture, more profound, more complex, and more distinctly associated with retrogressive nutritional changes; and, relying upon the gross anatomicopathologic observations made during the course of operative work, one must naturally refer these differences to the venous hyperæmia which is so striking a feature in prostatic as compared with stricture cases.

Turning to the more highly specialized histopathology, we see this difference even more accentuated. In an admirable contribution by Noel Halle and B. Motz,¹ conclusions based upon a study of 100 bladders of patients who have succumbed to chronic inflammatory affections of the urinary apparatus are presented. The cases include simple, non-obstructive cystitis, as well as cystitis occurring in stricture, and prostatic cases. Concerning the last named, they say in part: "With prostatics, the chronic inflammatory processes, together with the obstacle to the flow of urine, are not sufficient to explain all the conditions. Difficulties of retrogressive nutrition, due to senility, enter into the pathogenesis of the lesion."

"The vesical capacity, generally increased, is a direct result of the prostatic obstruction, acting primarily a long time before the invasion of the cystitis upon senile bladders whose tissues suffer from diminished resistance."

¹ "Contribution to the Pathological Anatomy of the Bladder," Noel Halle and B. Motz, *Annales des Maladies des Organes Génito-Uriinaires*, January and February, 1902.

"The muscular hypertrophy is not regular and complete; it predominates always in the internal plexiform layer; often it is limited to this layer alone. The columns which are characteristic of prostatic bladders are due to this hypertrophy. The fasciculi of the middle and external muscular layers, sometimes even diminished in volume by simple atrophy, lie embedded in a mass of abundant conjunctive tissue, loose, and often infiltrated with soft fat."

"We find, then, in this change in relation between the muscular and interstitial conjunctive tissue, the anatomical reason for vesical atony or insufficiency which we meet in prostatism."

"These lesions come, not from the chronic inflammation nor from the obstacle to the flow of urine, but are primary, trophic lesions of which age seems to be the only appreciable cause."

"We do not believe that the atrophy is primitive, but that the hypertrophy first takes place, rapidly followed by atrophy in the aged subject whose tissues are in a state of insufficient nutrition."

"In accord with Bahdanowicz and Giechanowski we think that the first cause of the lesions can be sought for in the primitive pathological lesions of the vessels of the bladder, arteriosclerosis, periarteritis, etc. We have noted no lesions of the nerves capable of explaining the degenerations."

In view of the observations of the pioneers in prostatectomy, Belfield and McGill, that apparently hopelessly diseased bladders of prostatics may be restored almost completely by operations which have been abundantly confirmed by subsequent observers, one may venture to ask if some, at least, of these conditions (sclerosis and atrophy) may not be accounted for by the venous hyperæmia which characterizes prostatic cases. The writer has seen this restoration occur in cases presenting all the characteristics of senile heart and arteriosclerosis.

If the foregoing is a correct estimate of the etiology and pathology of the vesical conditions in prostatism, it appears

that an adequate technique must include the removal not only of the urinary but equally of the circulatory obstruction; and that an operation which deals with only one of these is incomplete.

As this paper is intended to deal only with prostatectomy and its indications, it is not necessary to consider other operative procedures, further than to state that the two factors in the etiology of the disease vary greatly in their relations to each other in different cases; and that theoretically as well as practically these variations must have weight in the choice of operation. Moreover, there is no intention here to draw the *a priori* deduction that the modern electrocautery-prostatectomy necessarily deals alone with urinary obstruction, since with our present knowledge it is not possible to determine its effects upon the bulk of the gland.

As a matter of history, fourteen years have been required for the development of prostatectomy to its present incomplete state; and in the minds of many surgeons it is still on trial, while not a few regard it as unjustifiable. In the beginning (1888) the suprapubic route was the only one employed, and the operation of Belfield and McGill was incomplete, the results unsatisfactory, and the mortality high. As a matter of fact, one had to content himself with the removal of the intravesical projections with only such portions of the posterior part of the gland as could be reached from the vesico-urethral isthmus. To remove growths situated farther down the urethra, or even those immediately under the ring of the vesical neck, required an incision into the neck of the bladder, and this, experience soon taught, was full of the gravest dangers, primarily from hæmorrhage and secondarily from sepsis. The pain and vesical cramps excited by the pressure of gauze pads in the sensitive bladder necessitated the exhibition of morphine, often required perineal urethrotomy, and interfered with aseptic irrigation, all of which rendered the operation more hazardous, while complete prostatectomy was as yet not obtained.

It soon became apparent that if there were prostates which, for operative purposes, could not be reached from the perineum,

there were also prostates that could not be reached from the bladder, which led Belfield to practise and advocate the combined suprapubic and perineal incisions. This most important step in the evolution of the technique was the beginning of perineal prostatectomy, especially as it led to the demonstration that excochleation with the finger or a blunt instrument was possible, that it resulted in a great saving of time and reduction of hæmorrhage, while it afforded improved drainage.

The incision by which the prostate is to be reached from the perineum will probably depend largely upon whether the growths are to be attacked from the urethral or the capsular side of that body. Freely admitting the influence, in his own work, of the personal factor, the writer has not thought it advisable or necessary to follow, in any of his cases, the method of Von Dittel in his "cuneiform resections" by the "lateral" prostatectomy, nor that of Warhalm by the semi-circular perineotomy incision, for the reason that it did not appear advisable to precede one serious operation by another which cost blood and time. The growths have invariably been attacked from the urethral side for the reason that this was the most direct, that urethrotomy was necessary for vesical exploration, and fewer important structures were disturbed and fewer avenues to infection opened. Experience gained in doing a number of operations by the combined suprapubic and perineal incisions had convinced him that the fear of removing a considerable part of the floor of the prostatic urethra was groundless. Seeing that on four occasions he has removed, in perineal prostatectomy, vesical calculi which before the operation could not be touched with the stone searcher nor seen with the cystoscope, and which were without a subjective symptomatology, he found himself in accord with those who believe that a prostatectomy which does not permit at least of digital exploration of the bladder is likely to prove insufficient.

Since this is, in some measure, a record of experience, it is permissible to say that up to the present time a simple and free median perineal urethrotomy has given ample room for

work, even in the case of very large prostates; hence the Y-shaped incision has not been employed. In the main, therefore, he finds himself in accord with the practice of Belfield, McGill, Alexander, Nichol, Fuller, and others who have done so much to bring the technique of the operation up to its present state, and to stimulate the present gratifying interest in prostatic surgery. If there were a question as to the value of the work done, one would have but to point to the single fact that we



FIG. 1.—Penis omitted to show incisions.

have seen the operative mortality sink from 25 per cent. to probably less than 6 per cent., while there has been almost as great gain in the degree and permanency of the relief afforded to a class of old men beside whom we stood but yesterday all but helpless.

With such modifications as seem demanded by special conditions, the technique now practised is as follows:

The anæsthetized patient, whose perineum and abdomen

have been prepared as for a *cœliotomy*, is placed in the lithotomy position, a catheter introduced, the bladder irrigated with warm boric acid solution and filled with warm salt solution to a point just below that which produces distention-reflex. A broad, grooved staff is introduced, and a free, median, perineal

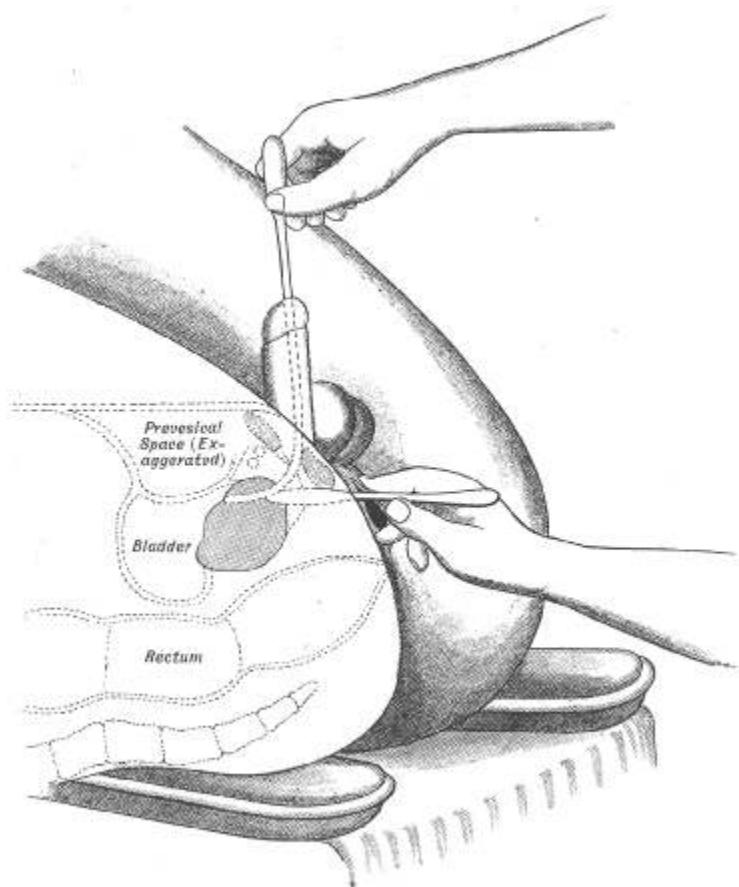


FIG. 2.—Staff introduced and incision into apex of prostate being made.

incision (Fig. 1) made in such a way as to open the urethra just in front of the apex of the prostate. Most frequently the bulb is split, in which case a spurting vessel is clamped or an oozing is stanchd by a catgut suture *en masse*. The knife, after entering the groove of the staff, is pushed backward far

enough to incise the ring at the apex of the prostate (Fig. 2), which is one of the least distensible parts of the duct. The forefinger follows well into the prostatic urethra, usually tearing it somewhat, and the staff is withdrawn. The finger quickly explores the prostatic urethra and ascertains whether the vesical outlet can be reached, after which the forefinger of the right hand in the rectum permits bimanual exploration of

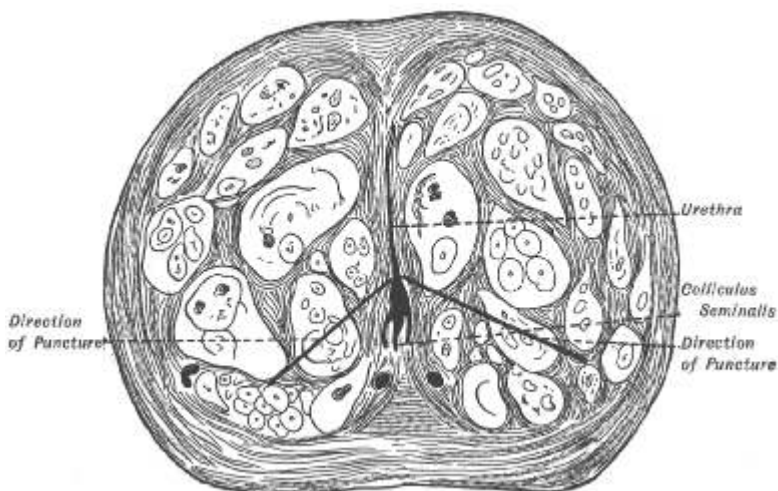


FIG. 3.—Transverse section through centre of hypertrophied prostate to show lines of puncture. Here it may be seen that the hypertrophied tissue may be removed without injury to the proper capsule or entering the fibrous sheath formed by the pelvic fascia. If all the urethra below the points of puncture were removed, its lumen would not be seriously abbreviated.

that part of the prostate within reach. Guided by the finger, a blunt instrument is now passed into the urethra and made to puncture, from the urethral side, the lowermost part of the mass. This puncture is always made in the lower posterior quadrant, and the instrument is pushed well into the swelling (Fig. 3). On its withdrawal, the finger tears its way into the centre of the mass (Fig. 4), which, even in fibrous prostates, is comparatively friable. The mass is now opened through to its capsule, the finger swept round its periphery without tearing the prostatic capsule or fibrous sheath of the

gland. In the meantime the urethra is felt to tear longitudinally. After the lobe has been loosened all around, there remains its attachment to the urethra, in detaching which care must be had not to take away too much of the sides nor any of the roof of the urethra. The floor may be disregarded if necessary. The hypertrophied lateral lobe is then removed,

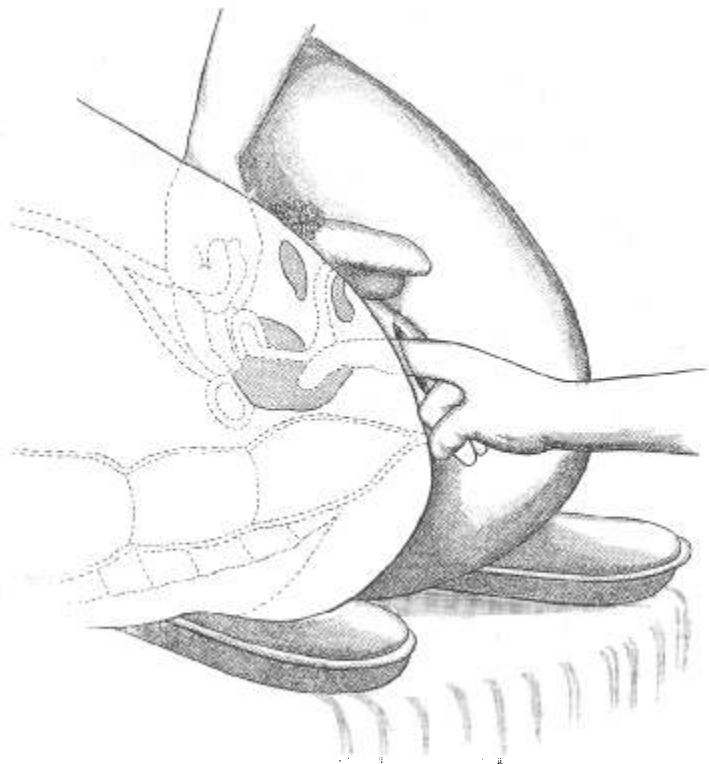


FIG. 4.—Showing forefinger of right hand enucleating while first and second fingers of left hand are making counterpressure from space of Retzius; neither the bladder nor peritoneum have been opened. (See Case I.)

to do which one has often to go well up beside and behind the neck of the bladder; yet it is possible to do this and keep within the capsule. Very little bleeding follows; but what there is appears to come from the torn mucous membrane, the lower part of which is brought away. If there be any difficulty in de-

livering the detached mass, which is often smooth and slippery, an ordinary lithotomy-forceps may be employed. If it is too large, it may be broken up with the finger or divided with the scissors.

This process is repeated on the opposite side, after which a median posterior segment sometimes remains to be dealt with. This can usually be done by sweeping the finger from side to side, its dorsal aspect towards the capsule, pushing it backward in such a way as to detach it well up behind the bladder and roll it downward. One may be surprised to find that he can get behind and excochleate what he had just felt as a pedunculated, intravesical projection, or a growth *en collerette*, bringing it well down by use of the forceps apparently without disturbing the fibrous ring at the vesical outlet. Most frequently one finds the attachment of this mass to the urethra quite firm; and, no matter how much care is taken, some of this membrane is brought away. The more the detached mass is rolled downward by pulling upon its upper surface, the less mucous membrane is removed. In some cases the whole of the floor, including the colliculus and verumontanum, has been removed without subsequent harm; in fact, in most of these cases this has been necessary, the explanation of which may be found in the anatomic fact that the collecting tubes of the prostate gland, passing from the lateral lobes, and, if there are any, from the median portion, as well as the ejaculatory ducts, unite here and empty into the sulci on either side of the verumontanum, while the colliculus often passes deeply into the tissue,—showing also how it is that those who practise excochleation from the capsular side find it necessary to make a hole in the urethra at this point, or to cut the pedicle with knife or scissors. Usually, the finger may now be passed with ease through the ring into the bladder, which, being emptied with the catheter, may be explored thoroughly, aided by pressure made by an assistant or by the disengaged hand, over the pubes. Fully relaxed by the anæsthetic, even fat men with protuberant bellies sometimes lend themselves to this procedure. In this

way stones have been discovered and removed by forceps, and in one case the opening to a herniated pouch has been entered.

If the operation is found to be complete, the cavity is now irrigated with a hot salt solution, until the oozing, which is usually slight, ceases, after which a finger is introduced and finds the floor and, for the most part, the sides of the urethra intact, the latter often hanging loosely against the outer sides of the cavity from which the growths have been removed. A large cavity is made out, between the lower part of which and the rectum there is felt a thin wall. Into the lower part of this, hinged posteriorly about the ring at the vesical neck, is an irregular flap of mucous membrane, which can be pushed up and back and often made to occlude the vesical outlet. The walls of this cavity feel rough, irregular, and often shreddy, nevertheless, they do not seem to be a poor basis for "taking" of a graft; for it seems that, if properly managed, this tongue of mucous membrane readily becomes attached, behaving subsequently like an autoplasmic flap. Care must be taken not to double backward and push this flap into the bladder when, as is now done, the large drainage tube is introduced, the wound edges retracted and the cavity packed with gauze, loosely or tightly, as may seem necessary to provide against subsequent hæmorrhage. In packing, one naturally takes account of any oozing point, usually found about the edges of the mucous membrane.

Formerly, enucleation from the perineum was not begun until we were assured that the finger could reach the vesical outlet and even enter the cavity of the bladder; but subsequent experience has modified the practice in this respect. Emboldened by the consideration that at any stage of the operation by the lower route one might cut into the supravescical space or even do an epicystotomy, excochleation has commenced as soon as the finger reached well enough beyond the prostatic apex to afford working space. In several instances it has happened that, as the lower portions were opened and removed, there was a sinking down of the base, which went on as the operation progressed until pressure from above easily brought

the neck of the bladder within reach, so that a finger could be hooked behind the ring. This might, it now appears, have been inferred *a priori*. It is the posterior layer of the deep perineal fascia which offers resistance to the downward growth of the gland; hence it is the enlargement of the lateral lobes which elevates the vesical outlet and stretches the prostatic urethra. This prop being removed, the result is all the more obvious, since we know that the anatomical, as distinguished from the pathological, perineal distance does not vary sufficiently to place the neck of the bladder beyond reach of the finger. Furthermore, we are aware of the fact that these growths are in a state of tension even after death, and probably more so during life, so that we may infer that something is gained in the shortening of the prostatic urethra by the natural tonus of its longitudinal fibres once they have play, and even more by intra-abdominal pressure when the obstacle is removed. Working from below, one is sometimes surprised to find that a thick panniculus and protuberant belly are not great obstacles to the efficient employment of hypogastric pressure.

Working in this way, it has been found in practice that there remains a smaller and apparently decreasing number of cases which require extraordinary appliances or additional operative procedures for the purpose of bringing the bladder within reach from the perineal incision. Hooks, volsella forceps, elastic balloons inflated after having been introduced into the bladder, etc., have been ingeniously devised and used by some, while epicystotomy and even coeliotomy have been practised by others. It was the confidence inspired by the efficiency of the method practised in the following case and repeated in several subsequent ones which later on made it seem justifiable to begin the operation of enucleation even before the vesical outlet came within reach.

CASE I.—A. B., whose bladder had been drained without relief for eighteen months by an epicystic fistula, was operated upon by the perineal incision on December 3, 1898. Failing to reach the bladder with the finger, fearing to begin excochleation

before this could be done, and realizing the necessity of rapid work on account of a well-defined aortic stenosis which rendered anæsthesia hazardous, an incision was made through the abdominal wall into the prevesical space, without opening either the peritoneum or bladder. The bladder having been emptied by a catheter, it was found that two fingers introduced into the space of Retzius (Fig. 4) easily enabled the prostate to be depressed and excochleation to be done, securing the removal of over 600 grains of tissue, a considerable part of which formed an *en collerette*, intravesical projection. The rapid closure of the fistula seemed good evidence of the thoroughness of the prostatectomy which the subsequent condition of the patient confirmed; frequency, dysuria, pyuria, and residual urine disappeared, all of which had persisted despite the suprapubic drainage.

Since doing this operation, all prostates and parts of them, whether of lateral lobes or intravesical projections of the median or posterior portions and whether epicystotomy had been previously done and had afforded opportunity for intravesical work, have been excochleated and delivered by the perineal incision. Experience gained in the course of this work has confirmed the initial impression that incision into the supravescical space should be postponed to the latter part of the operation, since even in the case of quite large prostates it may not be necessary. While further observation is required in order to determine the question, the impression has been gained that it will most frequently, perhaps only, be required in the case of extensive and pedunculated intravesical projections, if indeed these last named exist to the extent and frequency now believed. In the case of sessile and *en collerette* projections, one may be surprised to observe the ease with which they may be shelled out from beneath the trigonal space. In two personal cases, and in one of Dr. Willard Bartlett's, in all of which it had been necessary to do a preliminary epicystotomy, the finger in the bladder was able to feel the excochleation proceeding from the lower incision and working high up under the trigone. After working in this way, one is inclined to ask further proof than is now at hand of the degree

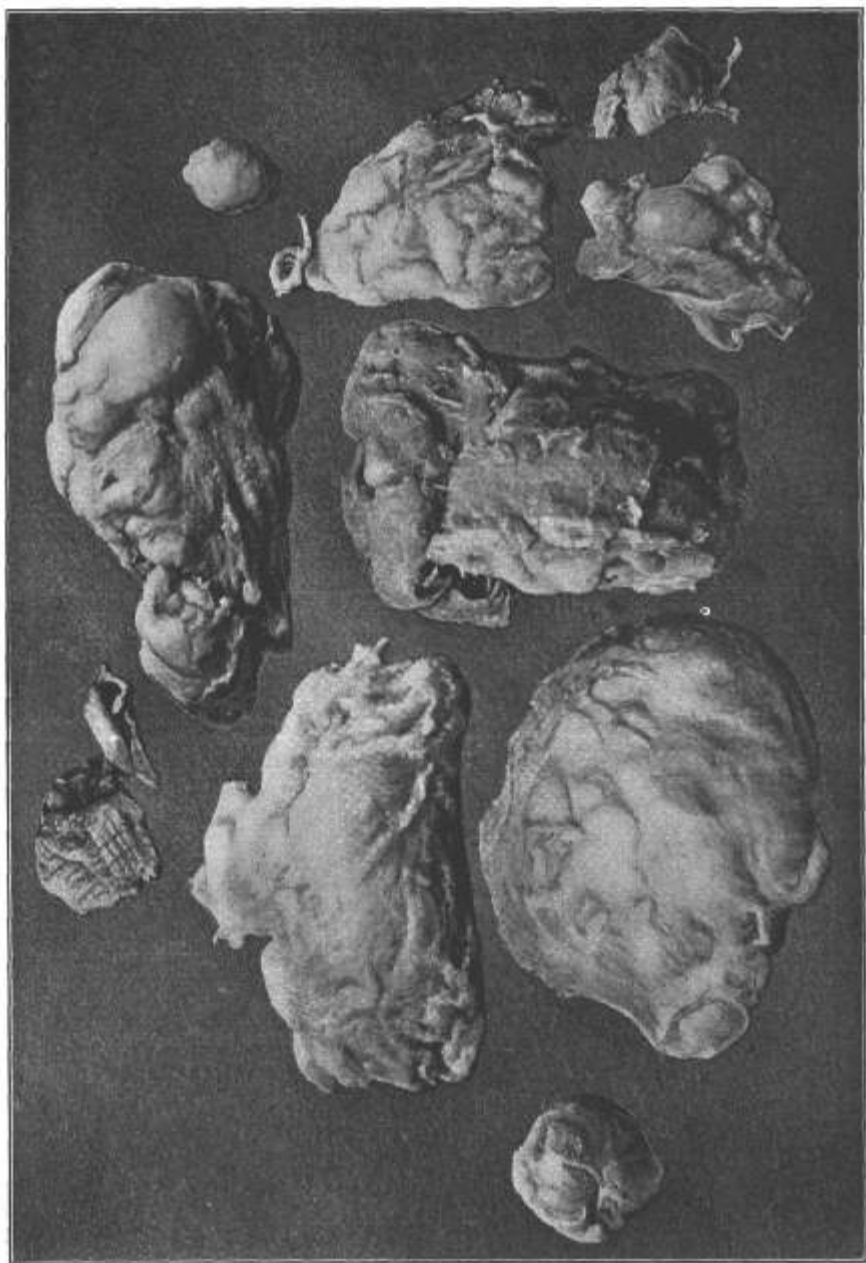


FIG. 5.—Nineteen hundred and twenty grains (four ounces) of prostatic tissue (see Case II) removed by perineal route. Natural size after having been kept in 4 per cent. formol solution for six months. Estimated shrinkage, 20 per cent.

of pedunculation and the extent to which it may prevent enucleation from below. One may, indeed, especially when doing prostatectomy by the combined perineal and epicystic incisions, make an autopsy *in vivo*, and so this question is not impossible of solution. Seeing the danger incident to incising the vesico-urethral ring either from above or below, viz., hæmorrhage, septic phlebitis, and subsequent dribbling of urine, the matter is not unimportant in its bearing on the question of modification of the technique. In one personal case it was thought necessary to pull down and twist off such an intravesical projection, and in another to incise and peel out a mass about the size of a hazel-nut, and in both cases hæmorrhage gave anxiety and necessitated close and painful packing. These were among the earlier experiences in complete enucleation from below; it is now believed that they could have been dealt with from beneath the bladder-wall.

As modifying the technique described above, the question of the size of the prostate which may permit delivery by the perineal incision, and the kind of incision which is primarily made and subsequently enlarged, has importance. This will in some measure be determined by whether one wishes to remove the prostate in one mass or by morcellation. Since there has appeared no satisfactory objection to piecemeal excochleation, this has been done, and so the simple, median perineal incision has been found adequate up to the present time.

CASE II.—Dr. T., aged sixty-four years, required suprapubic puncture and aspiration for retention which could not be relieved by catheter. The severity of the local and the gravity of the systemic symptoms were such as to require epicystotomy on September 20, 1901. Eight days later, both local and general conditions having improved, perineal prostatectomy was done, and 1920 grains (four ounces) (Fig. 5) of adenofibroma removed, entirely by the perineal incision. Epicystic wound healed in twenty-three days. Recovery with satisfactory result, except for slight leaking when the bladder was quite full. In January, 1902, there was no residual urine. Up to the time of the acute retention, the catheter had never been used.

Since fourteen years of prostatectomy by the suprapubic and combined suprapubic and perineal incisions have not sufficed to determine the question of the duration of the relief and the probability that portions of hypertrophied tissue remaining after operation may continue to grow and in time obstruct both urine and circulation, it cannot be hoped that less than four years of the more complete and radical perineal operation shall have furnished evidence sufficient for a solution of the problem. If one's impressions were of value to scientific research, it might be said that the modern operation is more complete, and therefore more likely to prove, in this respect, satisfactory. Something more like direct observation attaches to the following cases:

CASE III.—G. W. E., aged sixty-six years, with complete catheter dependence, required prostatectomy on January 12, 1895. By suprapubic operation, in forty minutes ninety-six grains of adenofibroma were removed, consisting chiefly of irregular intravesical projections. Convalescence required thirty-one days. Relief, never quite complete, for three years, when nocturnal frequency and dysuria again required the catheter. In another year there was complete dependence upon the catheter, with cystitis and pain on distention. September 28, 1901, perineal prostatectomy was done and 300 grains of tissue (Fig. 6) removed in twelve minutes. Urine passed by urethra on eighth day; nocturnal urination ceased on the eighteenth day, and patient was discharged on the twenty-first day without residual urine. Patient was confined to bed only seven days. Reports April 12 that condition is satisfactory, that he does not rise at night to void, and has not used catheter.

On the question of the relative thoroughness with which the operation can be done by the two routes, the following evidence may be presented.

CASE IV.—Specimen from E. J. G., aged sixty-two years, operated on (suprapubic route) in 1896, one year after castration had been done without relief, and 144 grains of tissue—chiefly

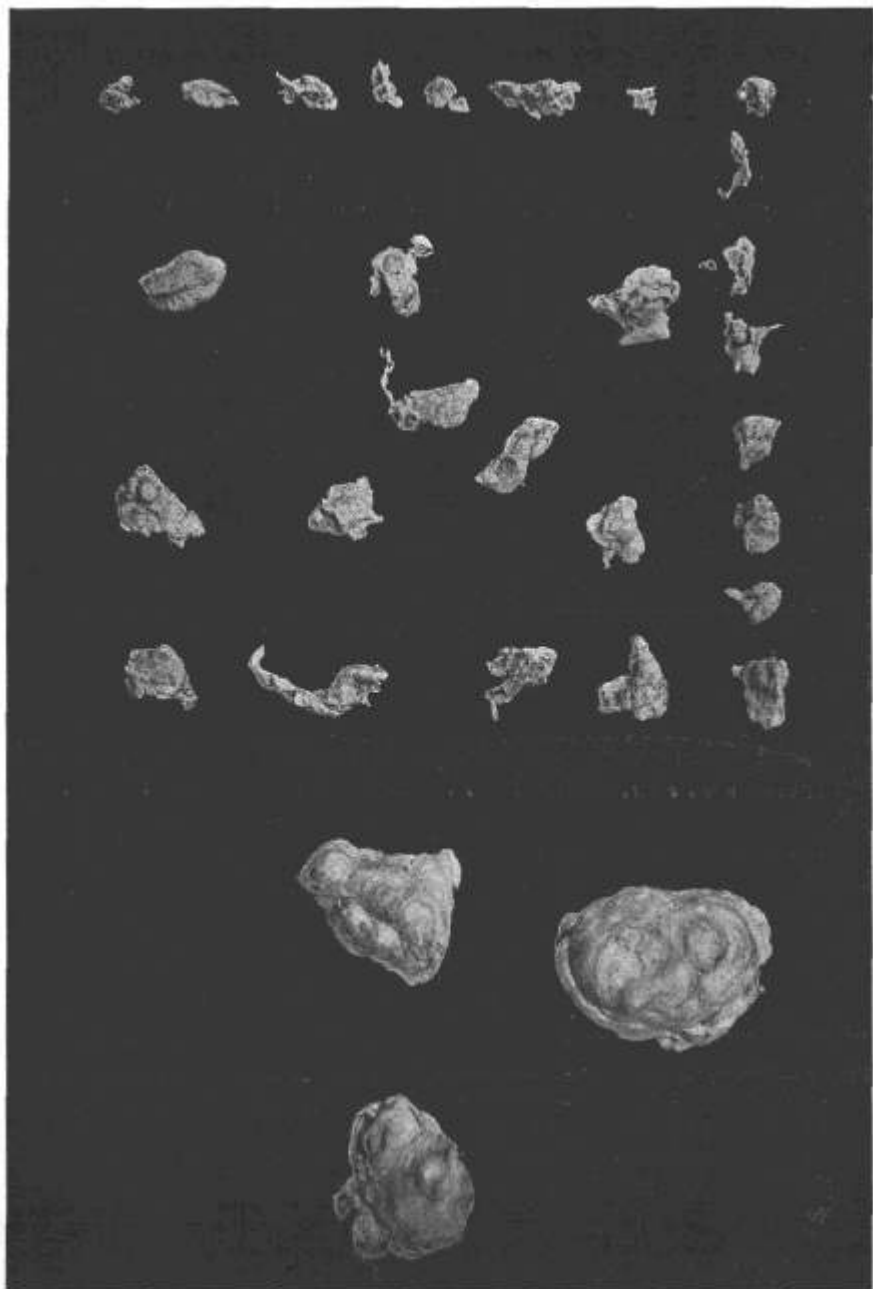


FIG. 6.—The twenty-eight small pieces in upper part of picture weigh ninety-six grains, and were removed by the suprapubic incision, chiefly with rongeur forceps, in 1895. The three larger pieces in lower part of picture were removed, by perineal section, in twelve minutes, six years later. They weigh 300 grains. (See Case III.)

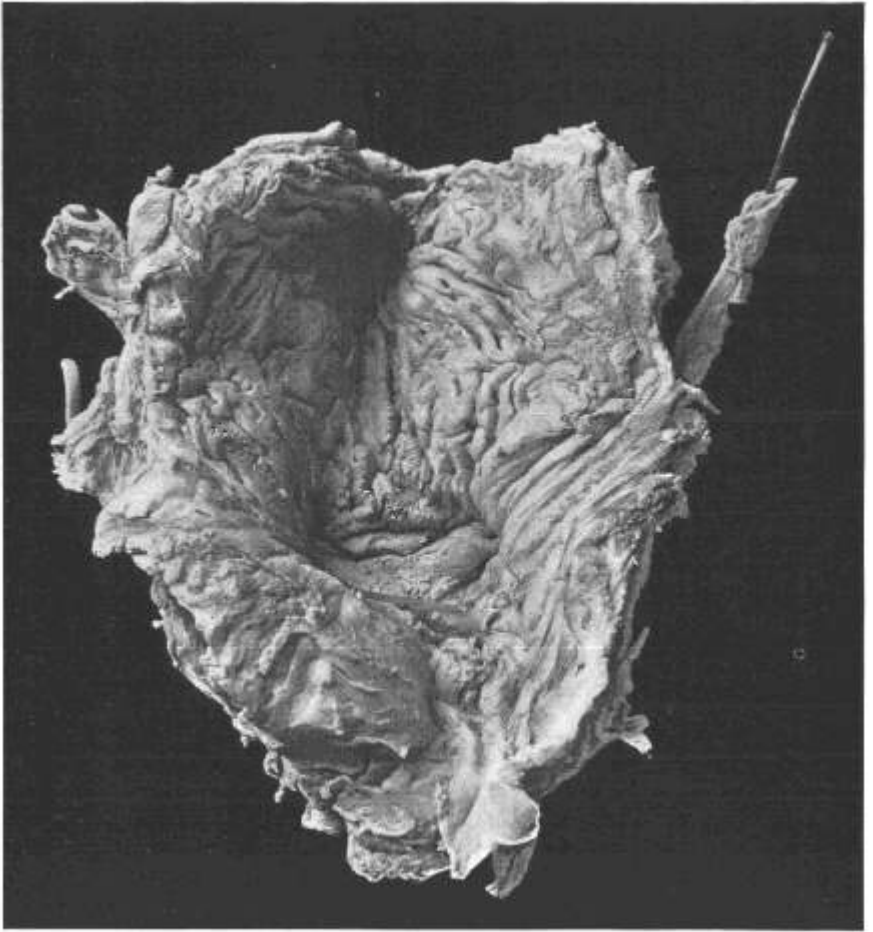


FIG. 7.—Illustrates incomplete prostatectomy by suprapubic section. Specimen, much shrunk by preserving fluid, shows two healed incisions on the sides and floor of prostatic urethra, through which 144 grains of prostate had been removed with rongeur forceps. Probably half of the gland tissue remains, the anterior part and the verumontanum being intact. (See Case IV.)

adenomatous — removed through two posterolateral incisions, which may be seen just healed (Fig. 7). Rongeur forceps was used, and it was believed at the time that the prostatic capsule had been practically emptied. This, as may be seen, is not true. There remains, probably, about one-third of the hypertrophied mass. The patient made a rapid recovery, the epicystic incision closing in fifteen days, but died subsequently of a heart trouble.

CASE V.—S. W., aged seventy-two years, subject of extensive arteriosclerosis, cyanosis, and tachycardia. Operation, perineal prostatectomy in twelve minutes on April 8, 1901, resulted in the removal of about 600 grains of tissue from the sides, floor, and posterior median part of the urethra, some of which was an *en colerette* projection. Ten months later, the patient succumbed to an intracranial hæmorrhage, preceded by hæmaturia and melæna.

The specimen (Fig. 8), otherwise quite interesting on account of the symptom complex associated with the large herniated pouch, is presented here to show: (1) that the prostate has been quite extensively removed, only a small portion of the left upper quadrant remaining; (2) that the floor of the urethra, about one-third of which was removed, has been reformed, the new mucous membrane being apparently adequate; (3) that there is but a thin rectovesical septum remaining, though before the operation there was felt a thick bulging mass of prostatic tissue; (4) that the "ring" of the vesicoprostatic isthmus with its lining membrane is quite intact, though a considerable mass of prostatic tissue was removed from behind it and from well up under the anterior angle of the trigone, and that all tissue capable of acting as an obstacle to both urinary and venous drainage has been removed. As a matter of fact, if we put aside the systemic condition which finally caused the death of the patient and the vesical symptoms due to the large herniated pouch, there remains, as to the ultimate effects of the operation, only the doubt whether enough prostatic tissue has been left to grow finally into an obstruction to urination. That the obstruction was once a considerable one seems to be demonstrated by the formation of a pouch

capable of holding nearly as much as the bladder from which it springs.

That the anatomical conformation of the hypertrophied tissue necessitates a modification of the technique, and that other associated conditions, notably catheter dependence, degeneration and cystitic, ureteritic and pyelonephritic complications may demand preliminary operative invention, the following case, among others, seems to indicate.

CASE VI.—E. J. S., aged seventy years, had been at first partially, and later totally, dependent upon the catheter for five years.

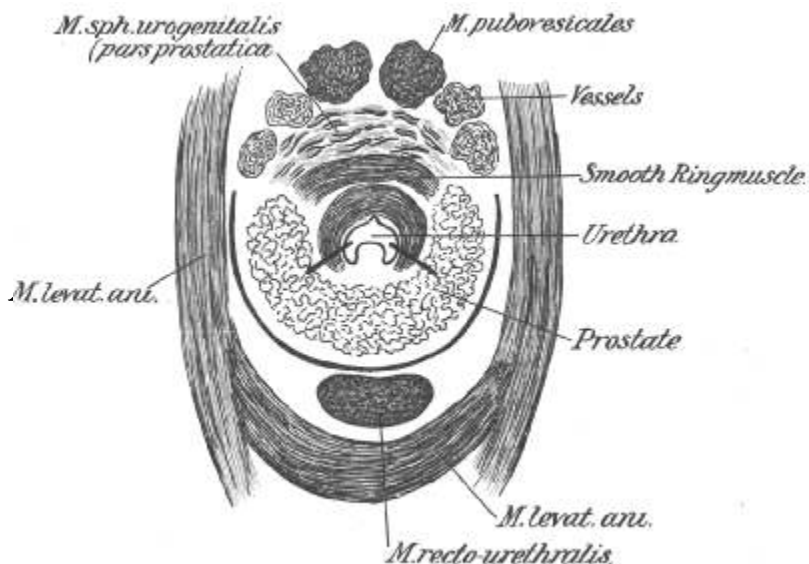


FIG. 10.—Diagram copied from Dr. Otto Kalischer, representing transverse section through middle of prostate. The heavy, black lines show how the incisions advocated in the paper avoid injury to the voluntary (red) and involuntary (blue) muscular structures of the parts. (DIE UROGENITALMUSKULATUR DES DARMES, Berlin, 1900, p. 44.)

Bladder degenerated, almost without trabeculation, atonic and chronically inflamed. Perineal prostatectomy in five minutes on March 2, 1901. Removal of 140 grains of tissue was followed in eight days by perineoscrotal erysipelas; infection by nurse. The tedious recovery from this left the patient unrelieved of the

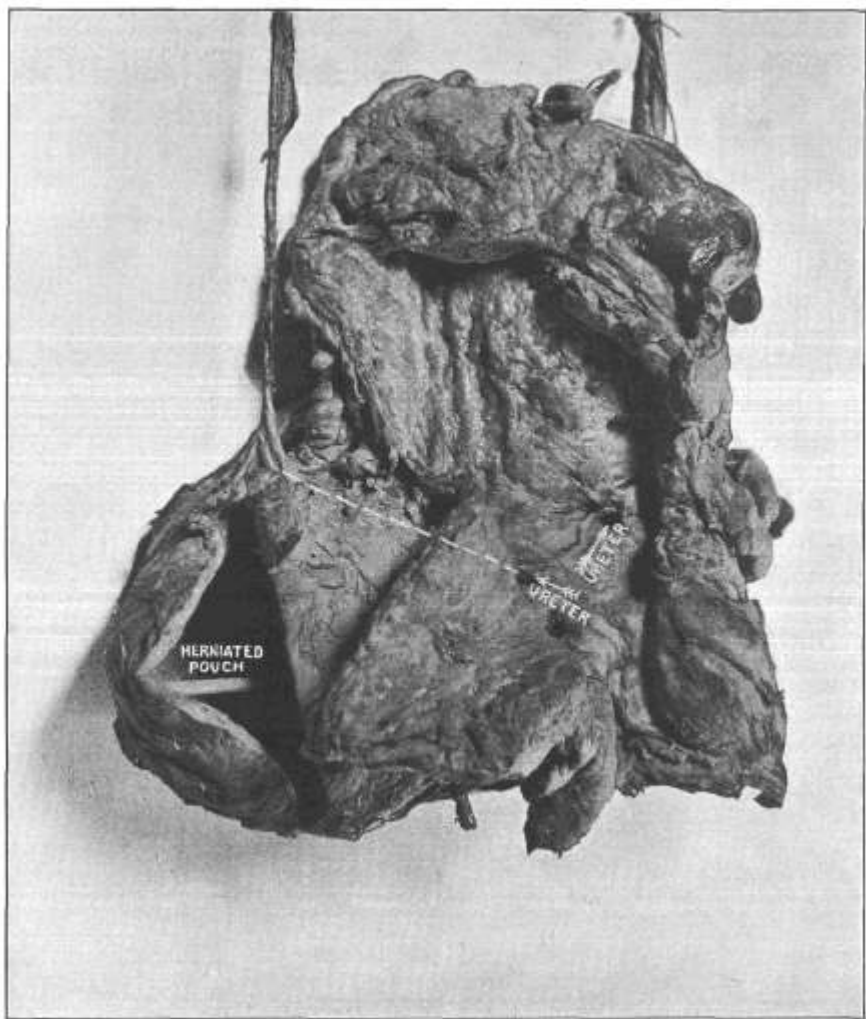


FIG. 8.—Case V shows almost complete removal of prostate by perineal route, only a small portion of the upper left quadrant remaining. Urethral floor completely restored and all obstruction to urination removed. Compare with Fig. 7.



FIG. 9.—Case VI. The two larger masses were removed at first operation by perineal section. Four months later the upper smaller mass was removed, by the same incision, from beneath and behind the vesico-urethral ring. Episcystotomy and drainage required for restoration of vesical function. Masses about two-thirds of normal size.

vesical distress. Abscesses and the persistence of the perineal fistula led to reopening of the perineum, when a small nodule was felt and removed from beneath the left urethrovesical ring (Fig. 9). This was done in July, four months after the first operation, and was followed by no relief of the vesical symptoms. Two and one-half months later symptoms of cystolithiasis making their appearance, an epicystotomy was done. Suprapubic drainage for one month resulted in satisfactory cure, with no residual urine and only a faint pyuria.

It remains to be said, in connection with the technique, that experience in this and other cases has led to the practice of doing, in four cases, a preliminary epicystotomy for drainage and the treatment of bladder and kidneys, and to the conviction that, when epicystotomy is demanded at all in prostaticism, it is an advantage to do it as a preliminary operation, and that this practice seems likely to materially reduce the mortality in that large class of cases coming for relief in the terminal stages of a surgical disease which is of serious import even in its inception.